

~~UNDERLYING ASSUMPTIONS FOR ESTIMATING FISHERY EFFECTS OF
CALFED ALTERNATIVES~~

June 5, 1998

SALMON

Recent analyses cast doubt on or refute the following assumptions in the salmon white paper. Attention to these discrepancies during June 5 through 21, would increase the reliability of the conclusions in the white papers.

1. Survival of outmigrating salmon smolts through the Delta and the number of smolts leaving the Delta is directly related to production of adults.
2. Hatchery grown salmon smolts released upstream of or in the Delta behave the same as "wild" salmon smolts.
3. San Joaquin River smolt survival through the Delta, and subsequent escapement and production, are each related positively to San Joaquin River flow at the time of smolt outmigration.
4. Smolt survival through the Delta, and subsequent escapement and production are each related negatively to exports during the time of smolt outmigration, especially for San Joaquin River smolts.
5. Movement of outmigrating salmon smolts through the Delta is significantly affected by the magnitude and direction of net (tidally averaged) flow. Therefore, export pumping draws or otherwise causes the movement of outmigrating salmon from the Sacramento, San Joaquin, and Mokelumne rivers into the southeastern Delta and ultimately to the export pumps. It also draws or otherwise causes the movement of other fish, such as Delta smelt, to the export pumps.
6. Other factors affecting the survival of eggs to adults, such as predation and food supply, are insignificant or constant from year to year.
7. Direct mortality of fish at the export pumps is mortality that would not have otherwise occurred.
8. A physical barrier at the Head of Old River will reduce the number of outmigrating salmon smolts reaching the southeastern Delta.
9. The abundance of anadromous and resident fish continues to be negatively related to X2 in February through June. Recent changes in the estuary have not invalidated these relationships.
10. Returning to flow conditions that would have existed under past levels of

development will increase abundance of anadromous fish.

11. The appropriate way to specify these flow or other conditions is by X2 rather than by some other measure or measures.

12. There is a positive relationship between Sacramento River flow and:

- Early survival of striped bass (egg to larvae)
- Survival of outmigrating salmon smolts
- Survival of other fish.

13. Rapid increases in export rates cause more fish to be drawn into the southeastern Delta and to the export pumps.

15. Higher levels of direct mortality at the export pumps.

16. There is a direct positive relationship between export rates and:

- Salmon smolt survival through the Delta
- The presence of other fish in the southeastern Delta
- Direct mortality at the export pumps.

17. The Rice-Newman model reliably demonstrates increased smolt survival when the Cross Channel Gates are closed in the spring.

18. The Rice-Newman results can be extrapolated to the November-January period.

19. Closing the Delta Cross Channel in November and January will not adversely affect other fish or aspects of Delta ecology.

20. The fraction of total Delta inflow exported is directly related to various factors (including direct mortality at the export pumps, survival of outmigrants through the Delta, movement of fish into the southeastern Delta, and indirect mortality) affecting the abundance of juvenile forms of anadromous and other fish.

21. QWEST, the calculated net flow in the lower San Joaquin River, is directly related to various factors (including direct mortality at the export pumps, survival of outmigrants through the Delta, movement of fish into the southeastern Delta, and indirect mortality) affecting the abundance of juvenile forms of anadromous and other fish.

22. The survival or abundance of juvenile anadromous and other fish is directly and positively related to the subsequent abundance of adults.

23. Changes in flows and exports in December and January have direct effects on the abundance of spring run salmon and other fish. The influence of other factors is constant or negligible and will therefore not influence these effects.

24. Indirect mortality is caused by water project operations in the Delta and is significant relative to direct mortality.

DELTA SMELT

1. Effects of salinity on delta smelt may not be best described by the relationship between delta smelt abundance and X2 position, as it is not supported by scientific evidence.
2. The team assumed a single population of delta smelt occurs in the delta. However, real time monitoring data indicates that at least two or maybe more populations could exist in the delta.
3. The team should evaluate effects for in-delta diversions other than the CVP and SWP.
4. The team should reconsider whether entrainment, hydrodynamics and predation were highly correlated.
5. The team assumed that a longer residence time, if true, in the Delta, results in higher population level mortality rates than would occur in downstream rearing areas. Data should be presented to support this assumption.
6. The team assumed shallow water habitats are only important for spawning and food production and not important rearing habitat. They also concluded that shallow-water habitat may have some value as a source of nutrients and production to the channels. Data should be presented to assess this hypothesis. Also, other habitat parameters such as cover should be considered, as they may be provided by shallow water habitat.
7. The team assumed that exposure to San Joaquin River origin water is equivalent to greater exposure to contaminants. However, most of the measured contaminants coming from the San Joaquin are coming in early spring, generally before the delta smelt are up in the spawning areas to any great extent, and this should be considered in the text. Also, Sacramento River should be included in the assessment.

8. The team based effects on relative CPUE available from the various existing monitoring programs. However, CPUE is not a good measure of delta smelt population levels, given the experiences of the past few years, and this should be recognized in the text.

9. The team assumed that screening criteria for both large project screens and smaller agricultural screens are unknown. However, the text should recognize that the CALFED Screening Team has developed criteria which they believe will probably work, based on swimming performance and behavior of adults and juveniles.

10. The team assumed that all delta smelt captured at the salvage facilities are of equal value to the population. However, assessments of effects should be reported in adult equivalents, since the potential survival to spawning of a 21 mm delta smelt, taken at the facility in August, is considerably different than an adult fish taken in March. A two week old delta smelt has a lot lower probability of surviving to spawn than an adult that is one week from spawning. Thus, such a qualification in the text seems appropriate.

11. The team assumed certain things regarding food supply which may be debatable. The text states that "Recent studies suggest that *Eurytemora affinis* is a preferred food item of delta smelt. Reductions in *Eurytemora* abundance through the introduction of exotic species such as clams (*Potamocorbula*) and copepods (*Pseudodiaptomus*, *Sinocalanus*, etc.) has led to the potential for food limitation for delta smelt." However, no references or data supporting this conclusion were presented.

12. The team conclusions in order to reflect export limitations and X2 flow requirements under the 1994 Water Accord. However, the team should reconsider whether it is appropriate (legal?) to use the Accord, a temporary situation, to evaluate the long term alternatives in a NEPA document.